MEDICARE HEALTH OUTCOMES SURVEY

REPORT ON THE HEALTH STATUS OF MANAGED CARE SMOKERS AND NONSMOKERS

MEDICARE HEALTH OUTCOMES SURVEY
COHORT III BASELINE AND FOLLOW UP

FINAL REPORT
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EXECUTIVE SUMMARY

Health Services Advisory Group examined differences in physical and mental health status for beneficiaries who were smokers and nonsmokers in *Cohort III* of the Medicare Health Outcomes Survey. *Cohort III Baseline* data were collected in 2000 and *Cohort III Follow Up* data were collected in 2002. This report compares demographic information, physical and mental health status as measured by the SF-36, chronic conditions, activities of daily living (ADLs), and clinical symptoms for smokers and nonsmokers. Additional analyses in this report examine the demographic and health status predictors of smokers at follow-up.

Descriptive analyses indicate that proportionally more smokers than nonsmokers were in the younger age groups. Higher proportions of beneficiaries were smokers than nonsmokers in the under 65 age category and in the 65-69 age group. Also, higher proportions of smokers were divorced compared to nonsmokers (Figure 1).

There were no meaningful differences between smokers and nonsmokers on a measure of physical health status. However, smokers had lower mental health scores compared with nonsmokers (Figure 2). There was only one meaningful difference between smokers and nonsmokers on the prevalence of specific chronic conditions. Smokers were more likely to report pulmonary problems.

Results of the logistic regression analyses indicated that beneficiaries who were advised to quit smoking by a physician (regardless of the number of visits in which they were advised to do so) had greater odds of smoking behavior at follow-up than those who were not. This finding resulted from both models used: one in which the smoking status at baseline was included and the other in which it was not. Additionally, low-income beneficiaries were more likely to be smokers at follow-up, as were younger beneficiaries (under the age of 65).

Effect size scales were used to evaluate whether the observed differences between groups were meaningful. In setting program priorities, the focus should be on effects that meet the threshold of at least a small effect.

Managed care plans should consider younger, low-income beneficiaries for smoking cessation interventions. These interventions may focus on social support, education for preventive health behaviors, and financial resources for smoking cessation.

Figure 1
Selected Demographics for Smokers and Nonsmokers
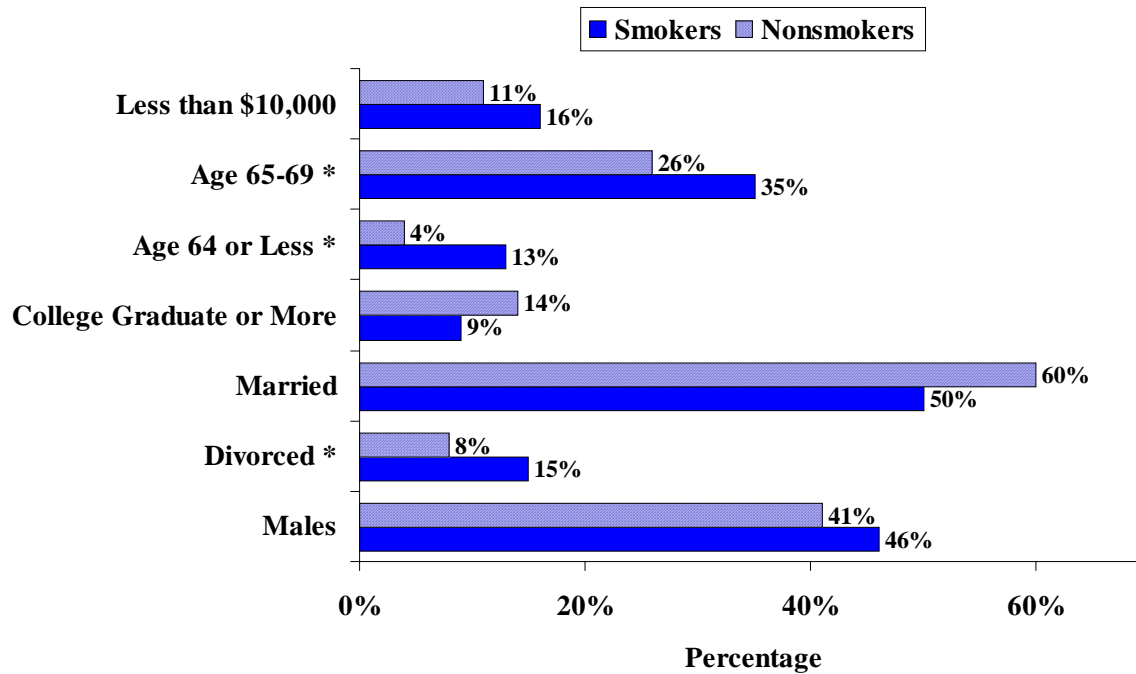
* Small effect size: $0.20 \leq h < 0.50$.
(See Methodology section for an explanation of effect size.)

Source: *Cohort III Baseline*, 2000 and *Follow Up*, 2002

Figure 2
Physical and Mental Health Status of Smokers and Nonsmokers
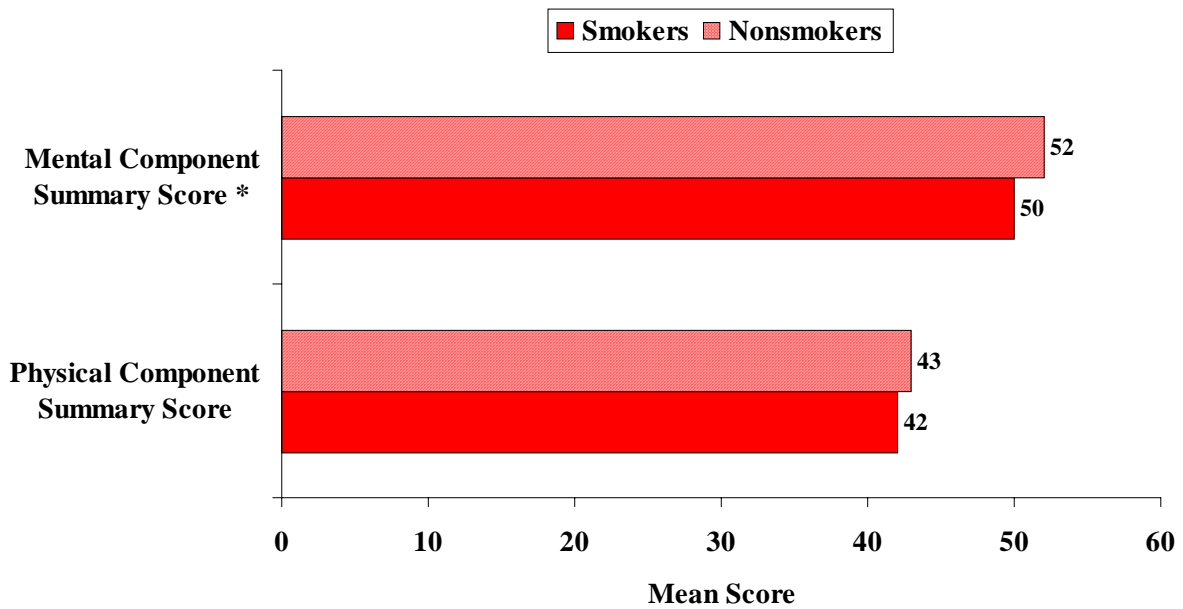
*Small effect size: $0.20 \leq g < 0.50$.
(See Methodology section for an explanation of effect size.)

Source:	*Cohort III Baseline*, 2000 and *Follow Up*, 2002

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INTRODUCTION

Using data from the 2001 National Health Interview Survey, recent research indicates that four factors contribute substantially to chronic disease prevalence: cigarette smoking, risky drinking of alcoholic beverages, overweight, and physical inactivity (Fine, Philogene, Gramling, Coups & Sinha, 2004). According to *The Health Consequences of Smoking: A Report of the Surgeon General*, the list of diseases caused by smoking now includes abdominal aortic aneurysm, myeloid leukemia, cataracts, cervical cancer, kidney cancer, pancreatic cancer, pneumonia, periodontitis, and stomach cancer (Department of Health and Human Services [DHHS], 2004). While significant information exists describing the demographic, behavioral, and psychological characteristics of smokers, as well as data on the physical consequences of smoking, the majority of these findings have focused on non-Medicare populations. There are very little data on beneficiaries in Medicare managed care.

According to the National Center for Health Statistics, the leading cause of death among the elderly is heart disease (2001). Other chronic diseases also rank high as causes of death: chronic obstructive pulmonary disease (COPD), diabetes, and pneumonia. All of these conditions can either be caused by smoking or are substantially aggravated by smoking. The medical impact of smoking has become so severe that the Surgeon General of the United States has referred to the health consequences of smoking as a full-blown epidemic (DHHS, 2001). For persons over 65 years of age, heart disease is the leading cause of death, and heart disease is strongly associated with smoking (DHHS, 2004). These historically high smoking rates have a significant price tag for the American taxpayer. Current Medicare expenditures for smoking-related illnesses account for approximately $20 billion per year (Parish, 2004).

Historically, the prevalence of smoking has been higher among males than females. This was due to the fact that males initiated smoking at earlier ages, smoked for longer periods of time, and smoked more frequently than their female counterparts. However, while women were less likely than men to start smoking, they were also less likely to quit smoking (DHHS, 2001). Current smokers by race and gender for 2000 through 2002 are presented below.

Current Smokers by Percentage of Race and Gender, 2000-2002[1]		
	Males	**Females**
White	25.4	21.3
African American	26.9	19.1
American Indian/Alaskan Native	31.6	36.7
Asian	19.5	6.9

Age has been shown to be a factor in smoking cessation. Older smokers are less likely than younger smokers to attempt to quit, but when older smokers try to quit, they are more likely to be successful in their attempts than are younger smokers (Burns, 2000). Increased educational attainment has also been correlated with decreased smoking prevalence; individuals with more education are less likely to have ever smoked. Moreover, if they have smoked, those with more education are more likely to have quit (DHHS, 1998). In *Women and Smoking* (DHHS, 2001), the surgeon general reported that smoking prevalence was nearly three times higher among women with only 9 to 11 years of education (33 percent) than among women with 16 or more years of education (11 percent).

Smoking has also been linked to income. Individuals below the poverty threshold are more likely than individuals at or above the poverty threshold to be current smokers and not to have quit, even after adjusting for sex, age, education, race, employment status, marital status, and geographic region (Flint & Novotny, 1997). These authors suggested that poverty might be an indicator of under-participation in the changing social norms regarding smoking behavior.

The literature provides support for the findings that smokers have more symptoms of depression and anxiety, more stressors, and lower socioeconomic status compared to nonsmokers (Lagrue, Dupont & Fakhfakh, 2002; Pampel & Rogers, 2004). The level of depression experienced by smokers may, in fact, be life threatening. Current smoking, either at light/moderate (less than 21 cigarettes per day) or heavy levels (greater than or equal to 21 cigarettes per day), was associated with suicide in a cohort of 36,527 adult men and women in Finland (Tanskanen, et al., 2000).

Smokers often do not engage in health-promoting lifestyles compared to nonsmokers. This association may be due more to the depression experienced by smokers than to the fact that they are smokers. In a recent study of 8,000 health maintenance organization (HMO) members over age 40, it was found that, after controlling for age, gender, professional advice to quit smoking, chronic disease, and education, smokers demonstrated significantly fewer positive health practices compared to individuals who had never smoked. Smokers were less likely to have

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[1] National Center for Health Statistics, 2004

healthy diets, engage in a regular exercise program, use seat belts, or participate in cancer screens than were nonsmokers and ex-smokers (Boyle, O'Connor, Pronk, & Tan, 2000).

The Medicare Health Outcomes Survey (HOS) provides an opportunity to examine the smoking status of beneficiaries in Medicare managed care. The large database provides a wealth of information on the physical and mental health status of this population as well as functional status and chronic conditions. The data presented here will provide information to assist policy makers by examining predictors of smoking status after a two-year interval.

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METHODOLOGY

BACKGROUND

The Medicare Health Outcomes Survey (HOS) assesses the physical and mental health status of the Medicare elderly enrolled in managed care in the United States. Beginning in 1998 and continuing annually, a new baseline cohort is created from a randomly selected sample of 1,000 Medicare managed care enrollees from each applicable Medicare contract market area. In plans with fewer than 1,000 beneficiaries, the sample includes the entire enrolled Medicare population that meets the inclusion criteria. Medicare beneficiaries who are continuously enrolled in the health plans for at least six months are eligible for sampling.

The data collection protocol includes a combination of mail and telephone surveys. Multiple mailings, standardized telephone interviews, interviewer training, and methods for maximizing response rates are well established in the HEDIS® (Health Plan Employer Data and Information Set[2]) specifications (NCQA, 1998).

THE MEDICARE HEALTH OUTCOMES SURVEY

The Medicare HOS instrument consists of three components: the SF-36 health survey, questions for case-mix/risk-adjustment purposes, and questions added by the Centers for Medicare & Medicaid Services (CMS) as required by the 1997 Balanced Budget Act.

The SF-36 health survey is a widely used multi-purpose, short-form health survey. Reliability and validity of the SF-36 have been well established (McHorney, Ware, Lu, & Sherbourne, 1994). The SF-36 yields an eight-scale profile of scores and is a generic measure as opposed to one that targets a specific age, disease, or treatment group. The eight scales form two distinct higher ordered clusters that are the basis for scoring the Physical Component Summary (PCS) measure and Mental Component Summary (MCS) measure. The SF-36 is scored from 0 to 100 points, with higher scores for both the individual scales and the summary measures indicating better functioning. For this analysis, the SF-36 individual scale scores, as well as the PCS and MCS scores, have been normed to the values for the 1998 general U.S. population, so that a score of 50 represents the national average for a given scale or summary score, with a standard deviation of 10. Higher scores on the SF-36 measures represent better physical and/or mental health status.

The scales provide the basis for two summary measures, the Physical Component Summary (PCS) score and the Mental Component Summary (MCS) score. Three of the scales (Physical Functioning, Role Physical, and Bodily Pain) correlate most highly with the PCS score and

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[2] HEDIS® is a registered trademark of the National Committee for Quality Assurance (NCQA).

contribute significantly to the scoring of the PCS measure. Two other scales (Mental Health and Role-Emotional) correlate most highly with the MCS score, and contribute significantly to the scoring of the MCS measure. Three of the scales (Vitality, General Health, and Social Functioning) have significant correlations with both of the summary components (Ware, Kosinski, & Keller, 1994).

Additional questions included in the Medicare HOS instrument address demographic and health characteristics of the population. These questions assess the prevalence of certain chronic medical conditions, level of depression, smoking behavior, and the ability to perform Activities of Daily Living (ADLs) and other functional activities.

ANALYTIC SAMPLE DESCRIPTION

The beneficiaries included in this study were respondents of *Cohort III Baseline* and *Cohort III Follow Up*, and represent survey results for 2000 and 2002. *Cohort III Baseline* consisted of 298,883 Medicare members from 275 plans in 306 market areas. The selection criteria utilized in this report required the respondent to have returned a questionnaire (no completion percentage required) or to have completed some portion of a telephone interview. Respondents must have indicated the frequency of their current smoking behavior at baseline and follow-up; "Every day," "Some days," or "Not at all." The final sample size was 61,892 beneficiaries; 54,333 were nonsmokers and 7,559 were smokers.

DATA ANALYSIS AND ANALYTIC STRATEGY

Nonsmokers at baseline were compared to smokers to determine if the groups differed in terms of demographics, the number and type of certain chronic medical conditions, the number and type of impaired ADLs, risk for depression, and the SF-36 summary scores. These analyses were designed to give a descriptive picture of the populations and identify key differences**.** Smokers at follow-up were defined as beneficiaries who responded positively to the question "Do you now smoke every day or some days?" Nonsmokers at follow-up were defined as beneficiaries who described their smoking behavior as "Not at all."

Traditional statistical measures produce numerous significant *p* values when large samples are compared, as is the case here. The question becomes, which of these statistically significant differences are large enough to be used in making policy decisions? Effect size is "A measure of the magnitude of a relationship, either in the units of the original measure…or in standardized units" (Cohen, Cohen, West, & Aiken, 2003, p. 673). For the descriptive analyses, effect size is used as the measure of importance. Different calculations are used for effect size depending on whether the response measure is a proportion (smokers vs. nonsmokers), a mean (smokers vs. nonsmokers), or a prediction of smoking behavior from other factors (logistic regression). The scale used to evaluate the effect size, however, is the same, with 0 corresponding to no effect and larger values corresponding to larger effects. The most common standard for deciding which effect sizes are meaningful are Cohen's (1988) definitions of small, medium and large effect sizes, which we have adopted here. A small effect size is defined as greater than, or equal to,

0.20, but less than 0.50. A medium effect size is greater than, or equal to, 0.50, but less than 0.80. And a large effect size is greater than, or equal to, 0.80.

Cohen's effect size for the difference between proportions p_1 and p_2 was calculated as:

$$h = |\varphi_1 - \varphi_2|$$

where: $\varphi_1 = 2\arcsin(\sqrt{p_1})$ and $\varphi_2 = 2\arcsin(\sqrt{p_2})$

The effect size for the difference between means x_1 and x_2 was calculated utilizing Hedges' g, (Rosenthal & Rosnow, 1991) using the pooled standard deviation:

$$g = \frac{x_1 - x_2}{s\ pooled}$$

Hedges' g is an inferential measure. It is normally computed by using the square root of the Mean Square Error from the analysis of variance testing for differences between the two groups.

An analytic issue that arises with the HOS data is the inherent nested design of the data; beneficiaries are members of managed care plans. Dependency that arises among subsets of this type of data is referred to as clustering (Cohen, et al., 2003). Clustering was assessed through calculation of the intraclass correlation coefficient (ICC), which measures the degree of clustering. The ICC was found to be 0.00831, indicating that clustering is not present among plans (Cohen, et al., 2003).

Logistic regression models were constructed to identify which variables predicted smoking behavior at follow-up. The odds ratio in these models measures the relative likelihood of an individual being a smoker at follow-up, given various demographic characteristics. Values greater than 1 correspond to more likely being a smoker than not. Effect-size calculations for these models are based on Chinn (2000).

The effect size for the difference between proportions p_1 and p_2 was calculated as:

$$\textbf{Effect size = (1.81) x ln(OddsRatio)}$$

Predictor variables were coded as presented on the following page.

CODING FOR PREDICTOR VARIABLES

<table>
<tr><th colspan="2">Predictor Variable</th><th>Coded As:</th></tr>
<tr><td rowspan="28">Demographics</td><td>Race
African American
Hispanic
Asian/Pacific Islander
American Indian/Alaskan Native

Other Race/Multiracial
White (Reference Group)</td><td>1 if African American, 0 otherwise
1 if Hispanic, 0 otherwise
1 if Asian/Pacific Islander, 0 otherwise
1 if American Indiana/Alaskan Native, 0 otherwise
1 if Other Race/Multiracial, 0 otherwise
0 if White</td></tr>
<tr><td>Income
Poor (Less than $10,000)
Low Income ($10,000 - $19,999)
Middle Income ($20,000 - $29,999)
Upper Middle Income ($30,000 - $49,999)
High Income ($50,000 and over; Reference Group)</td><td>
1 if Poor, 0 otherwise
1 if Low Income, 0 otherwise
1 if Middle Income, 0 otherwise
1 if Upper Middle Income, 0 otherwise
0 if High Income</td></tr>
<tr><td>Gender
Female
Male (Reference Group)</td><td>
1 if Female, 0 otherwise
0 if Male</td></tr>
<tr><td>Marital Status
Divorced/Separated
Widowed
Never Married
Married (Reference Group)</td><td>
1 if Divorced/Separated, 0 otherwise
1 if Widowed, 0 otherwise
1 if Never Married, 0 otherwise
0 if Married</td></tr>
<tr><td>Medicaid Status
Recipient of Medicaid
Not Recipient of Medicaid (Reference Group)</td><td>
1 if Recipient of Medicaid, 0 otherwise
0 if Not Medicaid Recipient</td></tr>
<tr><td>Educational Status
8th grade or less education
Some high school education
High school graduate
Some college education
College graduate (Reference Group)</td><td>
1 if 8th grade or less, 0 otherwise
1 if Some high school, 0 otherwise
1 if High school graduate, 0 otherwise
1 if Some college education, 0 otherwise
0 if College graduate</td></tr>
<tr><td rowspan="3">Risk Factors</td><td>Comorbidity
Number of Comorbid Chronic Medical Conditions</td><td>Sum of an Individual's Chronic Medical Conditions</td></tr>
<tr><td>Smoking Status
Current Smoker

Non Smoker (Reference Group)</td><td>
1 if Current Smoker, 0 otherwise

0 if Non Smoker</td></tr>
<tr><td>Positive Depression Screen
MCS score less than or equal to 42

MCS score greater than 42 (Reference Group)</td><td>
1 if MCS score less than or equal to 42, 0 otherwise
0 if MCS score greater than 42</td></tr>
</table>

CODING FOR PREDICTOR VARIABLES, CONTINUED

	Predictor Variable	Coded As:
Risk Factors	**Advised to Quit Smoking by Health Care Provider** 1 to 4 Visits (Low visits) 5 to 9 Visits (Medium visits) 10 or more Visits (High Visits) No visits	 1 if Low visits, 0 otherwise 1 if Medium visits, 0 otherwise 1 if High visits, 0 otherwise 0 if No visits

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RESULTS

DEMOGRAPHICS

The nonsmokers were older (mean age = 74) than the smokers (mean age = 70; effect size = 0.50). As shown in Table 1, about 19 percent of the nonsmokers were 80 years of age or older compared to the smokers (8 percent; effect size = 0.34). Smokers were more likely to be divorced (15 percent) than nonsmokers (8 percent), which met the criterion for a small effect size (0.23).

DEPRESSION

Two measures of depression are reported in Table 1. The first is a depression screen. A positive screen was defined as an affirmative response to at least one of the three depression questions in the HOS. These depression questions are as follows:

- In the past year, have you had 2 weeks or more during which you felt sad, blue, or depressed; or when you lost interest or pleasure in things that you usually cared about or enjoyed?
- In the past year, have you felt depressed or sad much of the time?
- Have you ever had 2 years or more in your life when you felt depressed or sad most days, even if you felt okay sometimes?

A small effect size was found for a positive screen. Approximately 25 percent of the nonsmokers had a positive screen, compared to about 36 percent of the smokers (effect size = 0.24).

High risk for depression was defined as a mean MCS score of less than, or equal to, 42. Small effect sizes were found for scores of less than, or equal to, 42, and greater than 42. About 25 percent of the smokers were at high risk for depression compared to 16 percent of the nonsmoker group (effect size = 0.22).

SF-36 SCORES AT BASELINE

Smokers had a lower mean MCS score than nonsmokers (Table 2). Smokers had a mean MCS score of 49.46 (standard deviation [SD] = 11.71) and nonsmokers had a mean MCS score of 52.35 (SD = 10.11). This comparison met the effect size criterion (0.28).

Differences were found between the groups for the General Health Scale. Smokers (44.56; SD = 10.86) had a lower mean score than nonsmokers (46.82, SD = 10.26; effect size = 0.22). The same pattern was found for the Social Functioning (SF), Role-Emotional (RE), and Mental Health (MH) Scales. Smokers had a lower mean SF score of 45.93 (SD = 12.21) compared to the

nonsmoker group (48.25; SD = 11.09; effect size = 0.21). The mean score for the RE scale for smokers was 45.38 (SD = 13.03) and the mean RE score for the nonsmokers was 47.95 (SD = 11.86; effect size = 0.21). The smokers had a lower mean MH score of (48.43; SD = 11.81) compared to nonsmokers' MH mean score of 51.33 (SD = 10.08; effect size = 0.28).

CLINICAL SYMPTOMS

Mean scores were computed for back pain, chest pain, shortness of breath, and peripheral neuropathy for smokers and nonsmokers (Table 3). The mean scores for these variables were calculated by adding affirmative responses to the symptom questions, then dividing by the number of people who gave an affirmative response. The peripheral neuropathy score was created by adding questions regarding numbness or loss of feeling in the feet, ankles or legs that swell, tingling or burning sensation in the feet, decreased ability to feel hot or cold with the feet, and sores or wounds that do not heal. The two questions on chest pain were added to create a mean score for this variable. The mean score for shortness of breath was created by adding positive responses to the question, "During the last four weeks, how often have you felt short of breath under the following conditions: when lying down flat, when sitting or resting, when walking less than one block, and when climbing one flight of stairs?"

The only difference between smokers and nonsmokers that met the effect size criterion was shortness of breath. The mean shortness of breath score for smokers was 0.67 and for nonsmokers the mean score was 0.49 (effect size = 0.20).

CHRONIC MEDICAL CONDITIONS

Only one difference that met the effect size criterion was found between the groups for a specific chronic condition. More beneficiaries who were smokers reported COPD (20 percent) compared to nonsmokers (12 percent, effect size = 0.22).

LOGISTIC REGRESSION RESULTS

Two logistic regression models were constructed to examine the impact of demographics, depression risk status, comorbidities, and advice to quit smoking on smoking status at follow-up. The first model included beneficiaries who were smokers at baseline, and the second model did not incorporate that group. The reason for examining two models was our concern that including smokers at baseline might mute the effects of any other potential predictors. Conclusions are based on the results of both models.

MODEL: BASELINE SMOKING STATUS INCLUDED

When including baseline smoking status in the logistic regression model, smoking status at baseline had an odds ratio estimate of 59.663 with a large effect size of 2.259 (Table 5). Age differences met the effect size criterion. Beneficiaries who were younger than 65 years old had an odds ratio estimate of 2.456 (effect size = 0.496), and those who were in the age category of 65 to 79 years old had an odds ratio estimate of 1.652 (effect size = 0.277).

American Indian/Alaska Natives were less likely to be smokers at follow-up (odds ratio estimate of 0.575, small effect size of -0.306).

In response to the HOS survey question, "In the last 6 months, on how many visits were you advised to quit smoking by a doctor or other health provider in your plan?" three response categories were created: one to four visits, five to nine visits, and ten or more visits. All three categories of visits to health providers also met the effect size criterion. One to four visits had an odds ratio estimate of 1.986 (effect size = 0.379); five to nine visits had an odds ratio estimate of 1.655 (effect size = 0.278); and for ten or more visits, the odds ratio estimate was 1.562 (effect size = 0.246). That is, beneficiaries who received advice to quit smoking were more likely to be smokers at follow-up than those who did not. The overall fit of the model was highly significant.

MODEL: BASELINE SMOKING STATUS NOT INCLUDED

The second logistic regression model did not include smoking status at baseline (Table 6). The results generally mirror the results of the model that included baseline smoking status; however, low-income beneficiaries were more likely to be smokers at follow-up in this model.

Beneficiaries who had a household income of less than $10,000 were more likely to be smokers at follow-up with an odds ratio estimate of 1.450 (small effect size of 0.205). Beneficiaries who had a household income of $10,000 to $19,999 were also more likely to be smokers at follow-up with an odds ratio estimate of 1.563 (small effect size of 0.247).

As in the first logistic regression, younger beneficiaries (under 65 years of age) had much higher odds of being smokers at follow-up with an odds ratio of 5.151 (large effect size of 0.906). Beneficiaries who were between the ages of 65 and 79 also had greater odds of being smokers at follow-up with an odds ratio estimate of 2.303 (small effect size of 0.461).

In this model, smokers who were advised to quit smoking, no matter how many visits they were advised to do so, had greater odds of being smokers at follow-up. For beneficiaries who reported one to four visits to a health provider, the odds ratio estimate was 11.413 (large effect size of 1.345), and for beneficiaries who reported five to nine visits, the odds ratio estimate was 10.120 (large effect size of 1.279). For beneficiaries who reported ten or more visits, the odds ratio estimate was 8.286 (large effect size of 1.168).

EXCLUDED GROUP COMPARISONS

By comparing beneficiaries in the analytic sample to beneficiaries who were lost at follow-up, we can better understand the extent to which the results can be generalized.

Table 7 presents comparisons between the analytic sample and involuntarily disenrolled beneficiaries, voluntarily disenrolled beneficiaries, deceased beneficiaries, nonrespondents at follow-up, respondents excluded from the analytic sample, and beneficiaries who had invalid surveys at follow-up.

The involuntarily disenrolled group had fewer male beneficiaries, fewer beneficiaries who were not married, fewer who had less than a high school education, and fewer who did not own their home compared to the analytic sample (all met the criterion for a small effect size).

The voluntarily disenrolled group had fewer male beneficiaries and fewer beneficiaries who were not married compared to the analytic sample (both met the criterion for a small effect size).

There were no differences that met the effect size criterion between the analytic sample and non-respondents at follow-up.

The deceased group had a higher proportion of beneficiaries who received Medicaid, fewer beneficiaries who were male, and fewer who were not married (all met the criterion for a small effect size). The deceased group also had lower baseline PCS and MCS scores compared to the analytic sample; medium effect sizes were found for both scores. The deceased group had more impaired ADLs (large effect size) and a medium effect size was found for more chronic conditions compared to the analytic sample. The deceased group had a mean age of 79.1 compared to a mean age of 73.0 for the analytic sample (medium effect size).

Excluded respondents had a higher proportion of beneficiaries who did not have a high school education, and a smaller proportion of males, compared to the analytic sample (all met the criterion for a small effect size). A larger proportion of the excluded respondents were older than the analytic sample (small effect size).

The invalid surveys group had a higher proportion of respondents who were Nonwhite than the analytic sample (small effect size). A higher proportion of the invalid surveys group had less than a high school education, and proportionally more had a household income less than $10,000. The invalid surveys group also had a higher proportion of beneficiaries who did not own their home and a higher proportion of beneficiaries who received Medicaid compared to the analytic sample (all met the criterion for a small effect size). This group had a higher proportion of older beneficiaries and a lower mean PCS score compared to the analytic sample (small effect size). Additionally, the invalid surveys group had more impaired ADLs compared to the analytic sample (small effect size).

For most of the comparisons, the excluded groups were similar to the analytic sample. Overall, the involuntarily disenrolled and the beneficiaries with invalid surveys differed the most from the analytic sample.

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DISCUSSION

The results of this study support the conclusion that younger, lower-income Medicare managed care beneficiaries are more likely to be smokers after a two-year interval. What was not expected in these findings is the increased likelihood of smoking at follow-up, despite advice to quit smoking by a physician. This finding resulted from both models. Several explanations are possible. First, it is possible that physicians tend to focus their advice on beneficiaries who are the least likely to quit smoking. Second, since nicotine is an addictive drug, simple advice to quit is likely to not be as effective for the more addicted people.

The challenge for managed care plans and for Medicare is to find a way to influence the cessation of smoking behavior for these beneficiaries. Research suggests that nicotine has antidepressive properties (Vazquez-Palacios, Bonilla-Jaime & Velazquez-Moctezuma, 2005). Hence, a first step in smoking cessation may be to start antidepressant medication and psychological therapy with these beneficiaries. Once the depression is under control, smoking cessation may be more successful. Recent research indicates that sustained-release bupropion is an effective treatment for smoking cessation (Tonstad & Johnston, 2004), as well as other selective serotonin reuptake inhibitors (Lagrue, Dupont & Fakhfakh, 2002).

The results of the current study support findings in the literature that individuals below the poverty threshold are more likely to be smokers (Flint & Novotny, 1997). Additionally, recent research indicates that elderly individuals enrolled in HMOs and receiving Supplemental Security Income were more likely not to engage in positive health practices and not to comply with medical directives (Green, Polen & Brody, 2003). Low-income beneficiaries should be targeted for assistance and support in improving their health by engaging in smoking cessation behaviors. Social support, specifically from family and peers, has been found to be positively associated with smoking cessation (Wagner, Burg & Sirois, 2004). The researchers found that in a sample of Veteran's Administration (VA) smokers, greater instances of social support are related to smoking cessation.

The findings from the VA study may be an explanation for the results in the current study regarding physician advice to quit smoking. Simple advice is not enough to counteract the powerful antidepressive properties of nicotine, lack of support, poverty, and negative health practices for many beneficiaries. What may be needed for these beneficiaries to quit smoking are support, education, and the financial resources necessary to afford antidepressant medication and/or psychotherapy. As stated in the introduction, approximately $20 billion of the Medicare budget goes directly to support the treatment of smoking-related illnesses annually. Antidepressant medication, therapy, education, and support may cost significantly less.

Future research in HOS cohorts and other Medicare populations should be conducted to validate the findings in the current study. Continued validation of findings from the current research of younger, low-income managed care beneficiaries could then drive changes in how Medicare and managed care plans help beneficiaries who are smokers overcome their addiction.

5

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APPENDIX

Table 1					
Demographics, Depression, and Mean Number of Impaired Activities of Daily Living at Baseline					
		Smoker **N = 7,559**		**Nonsmoker** **N = 54,333**		**Effect**
Category		**N**	**Percent**	**N**	**Percent**	**Size**
Gender	Female	4,069	53.8%	31,907	58.7%	0.10
	Males	3,463	45.8%	22,226	40.9%	
	Missing/Total	27/	7,559	200/	54,333	
Age	64 or Less	997	13.2%	2,511	4.6%	0.31 *
	65 - 69	2,660	35.2%	14,201	26.1%	0.20 *
	70 - 74	2,162	28.6%	15,343	28.2%	0.01
	75 - 79	1,158	15.3%	12,015	22.1%	0.18
	80 or Older	582	7.7%	10,263	18.9%	0.34 *
	Missing/Total	0/	7,559	0/	54,333	
Race	African American	547	7.2%	2,591	4.8%	0.10
	Hispanic	391	5.2%	2,622	4.8%	0.02
	Asian	91	1.2%	1,086	2.0%	0.06
	American Indian/Alaskan Native	48	0.6%	191	0.4%	0.03
	Other Race/Multiracial	104	1.4%	627	1.2%	0.02
	White	6,075	80.4%	45,553	83.8%	0.09
	Missing/Total	303/	7559	1,663/	54,333	
Education	8th Grade or Less	882	11.7%	6,032	11.1%	0.02
	Some High School	1,630	21.6%	8,729	16.1%	0.14
	High School Graduate/GED	2,762	36.8%	19,836	36.8%	0.00
	Some College	1,573	20.8%	11,531	21.2%	0.01
	4 Year College Graduate or More	651	8.6%	7,710	14.2%	0.18
	Missing/Total	61/	7,559	495/	54,333	
Annual Household Income	< $10,000	1,218	16.1%	6,065	11.2%	0.14
	$10,000 - $19,999	2,282	30.2%	13,357	24.6%	0.13
	$20,000 - $29,999	1,361	18.0%	9,990	18.4%	0.01
	$30,000 - $49,999	1,007	13.3%	8,900	16.4%	0.09
	> $50,000	443	5.9%	5,227	9.6%	0.14
	Missing/Don't Know/Total	1,248	7,559	10,794	54,333	

*Small effect size, between 0.20 and 0.50.

Table 1, Continued Demographics, Depression, and Mean Number of Impaired Activities of Daily Living at Baseline						
		Smoker		**Nonsmoker**		
		N=7,559		**N=54,333**		**Effect**
Category		**N**	**Percent**	**N**	**Percent**	**Size**
Marital Status	Married	3,807	50.4%	32,539	59.9%	0.19
	Divorced	1,140	15.1%	4,265	7.9%	0.23 *
	Separated	130	1.7%	393	0.7%	0.09
	Widowed	2,130	28.2%	15,056	27.7%	0.01
	Never Married	309	4.1%	1,837	3.4%	0.04
	Missing/Total	43/	7,559	243/	54,333	
Home Ownership	Owned	5,218	69.0%	41,555	76.5%	0.17
	Owned by family member	572	7.6%	3,445	6.3%	0.05
	Rented	1,464	19.4%	7,307	13.5%	0.16
	Not owned and live without payment of rent	125	1.7%	802	1.5%	0.02
	Missing/Total	180/	7,559	1,224/	54,333	0.11
Medicaid Status	Recipient of Medicaid	410	5.4%	1,723	3.2%	0.11
	Missing/Total	0/	7,559	0/	54,333	
Proxy Status	Proxy Respondent	765	10.1%	5,378	9.9%	0.01
	Missing/Total	463/	7,559	3083/	54,333	
Depression Screen	Positive Depression Screen	2,687	35.6%	13,368	24.6%	0.24 *
	Missing/Total	117/	7,559	893/	54,333	
Depression MCS score of $\leq$ 42	Depressed	1,873	24.8%	8,710	16.0%	0.22 *
	Missing/Total	348/	7,559	2327/	54,333	
		Mean	**SD**	**Mean**	**SD**	
Age		70.00	8.07	73.76	7.49	0.50 **
Activities of Daily Living	Number of Impaired ADLs	1.09	1.58	0.94	1.49	0.09

*Small effect size, between 0.20 and 0.50; **Medium effect size, between 0.50 and 0.80.

Table 2 SF-36 Mean PCS, MCS and Scale Scores at Baseline					
	Smoker N = 7,559		Nonsmoker N = 54,333		Effect Size
	Mean	SD	Mean	SD	
Physical Component Summary Score (PCS)	41.55	11.73	42.62	11.45	0.09
Mental Component Summary Score (MCS)	49.46	11.71	52.35	10.11	0.28*
Physical Functioning Scale	39.89	12.29	41.61	12.09	0.14
Role-Physical Scale	42.50	12.49	43.87	12.27	0.11
Bodily Pain Scale	45.42	11.93	46.49	11.07	0.10
General Health Scale	44.56	10.86	46.82	10.26	0.22*
Vitality Scale	47.85	11.09	49.69	10.62	0.17
Social Functioning Scale	45.93	12.21	48.25	11.09	0.21*
Role-Emotional Scale	45.38	13.03	47.95	11.86	0.21*
Mental Health Scale	48.43	11.81	51.33	10.08	0.28*

Note: Normed to the 1998 general population. Ware, Snow, Kosinski, and Gandek (1993).

* Small effect size, between 0.20 and 0.50.

Table 3 Clinical Symptoms at Baseline					
	Smoker N=7,559		Nonsmoker N=54,333		Effect
	Mean	SD	Mean	SD	Size
Clinical Symptoms					
Back Pain	1.18	1.29	0.95	1.16	0.18
Chest Pain	0.40	0.73	0.31	0.63	0.12
Shortness of Breath	0.67	0.89	0.49	0.76	0.20 *
Peripheral Neuropathy	0.49	0.73	0.44	0.66	0.07

*Small effect size, between 0.20 and 0.50.

Table 4 Chronic Medical Conditions at Baseline			Smoker N=7,559		Nonsmoker N=54,333		Effect Size
			N	Percent	N	Percent	
Angina/CAD‡	Yes		1,092	14.5%	8,236	15.2%	0.02
Missing/Total			138/	7,559	1,052/	54,333	
Any Cancer	Yes		846	11.2%	7,304	13.4%	0.07
Missing/Total			81/	7,559	552/	54,333	
Arthritis Hand/Wrist	Yes		2,348	31.1%	18,574	34.2%	0.07
Missing/Total			107/	7,559	789/	54,333	
Arthritis Hip/Knee	Yes		2,706	35.8%	21,692	39.9%	0.08
Missing/Total			85/	7,559	631/	54,333	
Congestive Heart Failure	Yes		435	5.8%	3,605	6.6%	0.03
Missing/Total			116/	7,559	1,010/	54,333	
COPD ¶	Yes		1,492	19.7%	6,359	11.7%	0.22*
Missing/Total			121/	7,559	759/	54,333	
Diabetes	Yes		1,109	14.7%	9,220	16.9%	0.06
Missing/Total			88/	7,559	588/	54,333	
GI Problems§	Yes		382	5.1%	2,767	5.1%	0.00
Missing/Total			175/	7,559	1,047	54,333	
High Blood Pressure	Yes		3,581	47.4%	29,759	54.8%	0.15
Missing/Total			84/	7,559	566/	54,333	
Myocardial Infarction	Yes		811	10.7%	5,540	10.2%	0.02
Missing/Total			132/	7,559	1,157/	54,333	
Other Heart Conditions	Yes		1,367	18.1%	11,617	21.4%	0.08
Missing/Total			130/	7,559	1,037/	54,333	
Sciatica	Yes		1,854	24.5%	12,290	22.6%	0.04
Missing/Total			132/	7,559	993/	54,333	
Stroke	Yes		618	8.2%	4,058	7.5%	0.03
Missing/Total			131/	7,559	942/	54,333	

*Small effect size, between 0.20 and 0.50.

‡ Coronary Artery Disease.

¶ Emphysema, Asthma, or Chronic Obstructive Pulmonary Disease.

§ Crohn's Disease, Ulcerative Colitis, or Inflammatory Bowel Disease.

	DF	Odds Ratio	95% Wald Confidence Limits	χ^2 Value	p Value	Effect Size	
Table 5							
Prediction of Smoking at Follow-Up: Smoking Status at Baseline Included							
African American	1	0.984	0.783 - 1.237	0.019	0.891	-0.009	
Hispanic	1	0.887	0.688 - 1.144	0.853	0.356	-0.067	
Asian	1	1.049	0.646 - 1.702	0.037	0.847	0.026	
American Indian/Alaskan Native	1	0.575	0.292 - 1.133	2.559	0.109	-0.306	*
Other Race/Multiracial	1	1.203	0.704 - 2.054	0.457	0.498	0.102	
Missing Income Data	1	1.105	0.855 - 1.429	0.587	0.444	0.055	
Less than $10,000	1	1.230	0.936 - 1.616	2.207	0.137	0.114	
$10,000 - $19,999	1	1.416	1.112 - 1.804	7.948	0.005	0.192	
$20,000 - $29,999	1	1.022	0.798 - 1.308	0.029	0.864	0.012	
$30,000 - $49,999	1	1.172	0.910 - 1.509	1.517	0.218	0.088	
8th grade or less	1	1.072	0.825 - 1.392	0.27	0.603	0.038	
Some high school	1	1.088	0.868 - 1.364	0.535	0.464	0.047	
High school graduate	1	1.075	0.876 - 1.319	0.478	0.489	0.039	
Some college	1	1.078	0.869 - 1.337	0.469	0.493	0.041	
Less than 65 years	1	2.456	1.882 - 3.203	43.871	<0.0001	0.496	*
65-79 years	1	1.652	1.361 - 2.004	25.811	<0.0001	0.277	*
Female	1	1.190	1.061 - 1.334	8.819	0.003	0.096	
Proxy Respondent	1	0.831	0.686 - 1.007	3.569	0.059	-0.102	
Medicaid Recipient	1	1.216	0.911 - 1.623	1.769	0.184	0.108	
MCS Score $\leq$ 42	1	1.142	0.987 - 1.321	3.186	0.074	0.073	
Sum of Comorbidities	1	0.963	0.935 - 0.993	5.892	0.015	-0.021	
Advised to quit smoking on 1 to 4 visits to the Dr.	1	1.986	1.743 - 2.262	106.557	<0.0001	0.379	*
Advised to quit smoking on 5 to 9 visits to the Dr.	1	1.655	1.166 - 2.349	7.943	0.005	0.278	*
Advised to quit smoking on 10 or more visits to the Dr.	1	1.562	1.083 - 2.253	5.706	0.017	0.246	*
Smoker at Baseline	1	59.663	52.173 - 68.229	3568.371	<0.0001	2.259	***

* Small effect size, between 0.20 and 0.50.

*** Large effect size, greater than 0.80.

Table 6 Prediction of Smoking at Follow-Up: Smoking Status at Baseline Not Included						
	DF	Odds Ratio	95% Wald Confidence Limits	χ^2 Value	p Value	Effect Size
African American	1	0.968	0.817 - 1.146	0.145	0.704	-0.018
Hispanic	1	0.882	0.729 - 1.066	1.683	0.195	-0.069
Asian	1	0.970	0.686 - 1.373	0.029	0.865	-0.017
American Indian/Alaskan Native	1	1.037	0.577 - 1.862	0.015	0.904	0.020
Other Race/Multiracial	1	0.988	0.671 - 1.455	0.004	0.952	-0.007
Missing Income Data	1	1.165	0.962 - 1.410	2.449	0.118	0.084
Less than $10,000	1	1.450	1.183 - 1.778	12.811	0.0003	0.205 *
$10,000 - $19,999	1	1.563	1.306 - 1.871	23.679	<0.0001	0.247 *
$20,000 - $29,999	1	1.149	0.954 - 1.383	2.149	0.143	0.077
$30,000 - $49,999	1	1.190	0 987 - 1.436	3.311	0.069	0.096
8th grade or less	1	1.050	0.866 - 1.274	0.246	0.619	0.027
Some high school	1	1.155	0.977 - 1.364	2.848	0.092	0.079
High school graduate	1	1.178	1.013 - 1.371	4.504	0.039	0.091
Some college	1	1.180	1.007 - 1.384	4.179	0.041	0.091
Less than 65 years	1	5.151	4.213 - 6.299	255.088	<0.0001	0.906 *
65-79 years	1	2.303	1.991 - 2.664	126.445	<0.0001	0.461 *
Female	1	1.250	1.149 - 1.360	26.842	<0.0001	0.127
Proxy Respondent	1	0.939	0.811 - 1.086	0.721	0.396	-0.035
Medicaid Recipient	1	1.087	0.881 - 1.341	0.605	0.437	0.046
MCS Score $\leq$ 42	1	1.129	1.014 - 1.256	4.937	0.026	0.067
Sum of Comorbidities	1	0.848	0.829 - 0.867	209.369	<0.0001	-0.091
Advised to quit smoking on 1 to 4 visits to the Dr.	1	11.413	10.347 - 12.590	2366.599	<0.0001	1.345 ***
Advised to quit smoking on 5 to 9 visits to the Dr.	1	10.120	7.592 - 13.491	248.983	<0.0001	1.279 ***
Advised to quit smoking on 10 or more visits to the Dr.	1	8.286	6.174 - 11.120	198.41	<0.0001	1.168 ***

* Small effect size, between 0.20 and 0.50.

*** Large effect size, greater than 0.80.

	Analytic Sample		Involuntarily Disenrolled [1]		Voluntarily Disenrolled [1]		Deceased at Follow up		Non-Respondents at Follow up		Respondents Excluded from Analytic Sample		Invalid Surveys at Follow Up	
	61,892		**92,099**		**91,428**		**29,326**		**16,454**		**6,751**		**933**	
Category	**Percent** [2]	**(N)**	**Percent** [2]	**(N)**	**Percent** [2]	**(N)**	**Percent** [2]	**(N)**	**Percent** [2]	**(N)**	**Percent** [2]	**(N)**	**Percent** [2]	**(N)**
Male	41.5%	25,689	20.1% *	18,497	31.1% *	28,472	26.8% *	7,844	40.2%	6,618	28.5% *	1,927	41.9%	391
Missing/Total	227/	61,892	48,471/	92,099	24,542/	91,428	13,722/	29,326	414/	16,454	723/	6,751	22/	933
Non-White [3]	10.3%	6,348	6.0%	5,565	9.1%	8,304	6.2%	1,808	15.1%	2,478	14.2%	957	23.6% *	220
Missing/Total	761/	61,892	49,128/	92,099	25,235/	91,428	13,946/	29,326	670/	16,454	824/	6,751	63/	933
Not Married	40.8%	25,260	20.3% *	18,685	30% *	27,518	26.9% *	7,915	45.7%	7,514	44.7%	3,016	48.7%	454
Missing/Total	286/	61,892	48,731/	92,099	24,718/	91,428	13,827/	29,326	452/	16,454	733/	6,751	27/	933
Less than High School	27.9%	17,273	14.6% *	13,410	22.2%	20,293	21.0%	6,163	33.9%	5,573	38.2% *	2,577	48.6% *	453
Missing/Total	556/	61,892	49,026/	92,099	25,252/	91,428	14,023/	29,326	634/	16,454	827/	6,751	47/	933
Less than $10,000	11.8%	7,283	9.6%	6,280	9.7%	8,734	14.8%	2,845	14.8%	2,437	16.6%	1,119	21.2% *	198
Missing/Total	12,042/	61,892	57,687/	92,099	38,864/	91,428	17,316/	29,326	4,770/	16,454	2,343/	6,751	250/	933
Home Not Owned	22.2%	13,715	12.1% *	11,155	83.1%	15,444	81.7%	5,366	25.8%	4,247	23.5%	1,588	44.3% *	392
Missing/Total	1,404/	61,892	49,884/	92,099	26,294/	91,428	14,566/	29,326	1,017/	16,454	1,023/	6,751	49/	933
Recipient of Medicaid	3.5%	2,133	6.5%	6,027	3.6%	3,324	9.3% *	2,717	4.7%	773	4.2%	282	11.0% *	103
Missing/Total	0/	61,892	0/	82,099	0/%	91,428	0/	29,326	0/	16,454	0/	6,751	0/	933
	Mean	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**
Age in Years	73.00	7.66	72.85	9.25	72.74	8.35	79.06	9.14 **	74.32	8.69	75.68 *	7.61	75.11 *	9.89
Baseline PCS Score	42.49	11.49	42.12	11.65	42.52	11.56	34.18	11.08 **	41.69	11.67	41.38	11.24	40.46 *	11.46
Baseline MCS Score	52.00	10.36	50.69	11.23	51.50	10.67	45.73	12.57 **	50.35	11.26	49.94	10.93	47.45	12.02
Number Impaired ADLs	0.96	1.51	1.10	1.64	1.00	1.55	2.38	2.14 ***	1.18	1.69	1.07	1.59	1.57 *	1.97
Number Chronic Conditions	2.59	1.93	2.67	2.01	2.62	1.99	3.51	2.28 **	2.57	2.00	2.60	1.95	2.76	2.11

Table 7
Excluded Groups: Demographics at Baseline

[1] Involuntarily disenrolled includes beneficiaries whose plans were no longer a part of HOS in 2000; voluntarily disenrolled includes beneficiaries who left their
health plan between baseline (2000) and follow up (2002).

[2] Percent is based on the number of persons who responded to the question.

[3] Non-white includes the categories "American Indian or Alaskan Native," "Asian or Pacific Islander", "Black or African American," and "Another race or multiracial."

* Small effect size, between 0.20 and 0.50, for differences between that group and the analytic sample.

** Medium effect size, between 0.50 and 0.80, for differences between that group and the analytic sample.

*** Large effect size, greater than 0.80, for differences between that group and the analytic sample.